

Wide Bandgap Nanostructured Space Photovoltaics, Phase I

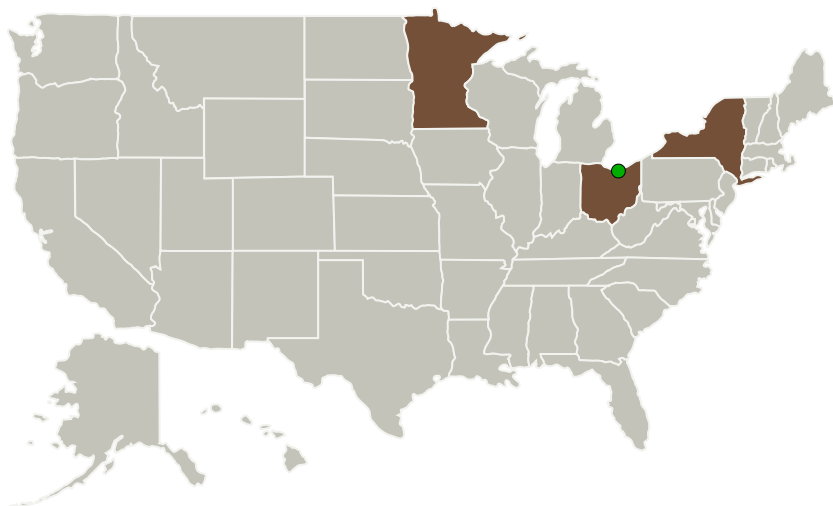
Completed Technology Project (2010 - 2011)



Project Introduction

Firefly, in collaboration with Rochester Institute of Technology, proposes an STTR program for the development of a wide-bandgap GaP-based space solar cell capable of efficient operation at temperatures above 300oC. Efficiency enhancement will be achieved by the introduction of InGaP quantum wells within the active region of the wide-gap base material. The introduction of these nanoscale features will enable harvesting of low-energy photons that are normally lost by transmission through the wide bandgap material. Successful completion of the proposed work will combine the high-temperature, radiation-tolerant wide-bandgap material with current-enhancing nanostructures to produce a high efficiency space solar cell capable of operating at higher temperatures suitable for near-sun missions. This achievement can result in significant cost savings as active cooling of PV systems would be unnecessary with this technology.

Primary U.S. Work Locations and Key Partners



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| Organizations Performing Work | Role | Type | Location |
|--|-------------------------|---|------------------------|
| Firefly Technologies | Lead Organization | Industry Women-Owned Small Business (WOSB) | Shakopee, Minnesota |
| ● Glenn Research Center(GRC) | Supporting Organization | NASA Center | Cleveland, Ohio |
| Rochester Institute of Technology(RIT) | Supporting Organization | Academia | Rochester, New York |

Primary U.S. Work Locations

| | |
|-----------|----------|
| Minnesota | New York |
| Ohio | |

Project Transitions

▶ **January 2010:** Project Start

✓ **January 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140653>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Firefly Technologies

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

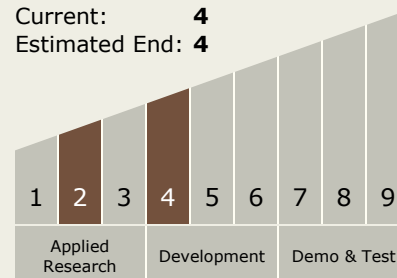
Carlos Torrez

Principal Investigator:

David A Forbes

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System